

# Raine Square

## Diaphragm Walls & Anchors



**Developer: Saracen Properties**  
**Main Contractor: Diploma**

**Specialist Contractor: GFWA**

## THE PROJECT

Raine Square is a 44,000 m<sup>2</sup> office and 13,000 m<sup>2</sup> retail project in the heart of Perth's CBD and will be the new home of Bankwest. The development will include three levels of retail, a podium area, a 21 storey office tower and access from Wellington, William and Murray Streets, and also the underground tunnel link to the new William Street Station.

Raine Square also boasts 379 car bays over three basement levels with an area of 21,000 m<sup>2</sup>, improving public access to the development.

Bulk excavations as deep as 13 m required a robust retaining system to support adjacent buildings and infrastructure

The upper 7 m of ground was composed of sandy soil followed by a layer of sandy clay, approximately 2 m thick. These layers were underlain by dense clayey sands and sandy clays down to the depth of approximately 34 m. Although groundwater level was lower, perched groundwater was at the depth of about 2 m.

## THE ROLE OF GFWA

GFWA was awarded the design and construct contract for the retaining system, proposing diaphragm wall in combination with ground anchors.

The diaphragm wall is composed of 60 panels, each 600 mm thick to depths up to 19 m. In total 5,200m<sup>2</sup> of wall were constructed, with the perimeter measuring 380 m. Excavation rates exceeded 80 m<sup>2</sup>/day, with practical completion of D-Wall works achieved 2 weeks ahead of schedule.

A total of 431 anchors, in two to three rows, depending on the panel elevation and depth, were installed as tie backs for the diaphragm walls. GFWA's in house designed vibrodriver casing system was utilised for anchor installation in the upper sands. Two machines were deployed on these upper anchors, with peak productions rates of 18 anchors installed per day. Lower level anchors, installed through clay were drilled by rotary water-flush and duplex casing system. Peak installation rates of 4 to 5 anchors were achieved.

**Perth**  
Sydney  
Brisbane  
Melbourne

**113 Radium St, Welshpool WA 6106**  
13-15 Lyonpark Road, Macquarie Park NSW 2113  
3 Harvton Street, Stafford QLD 4053  
41 Boundary Road, North Melbourne VIC 3051

**Tel: 61 8 9350 5394 Fax: 61 8 9358 3095**  
Tel: 61 2 9491 7100 Fax: 61 2 9491 7111  
Tel: 61 7 3354 9100 Fax: 61 7 3354 9111  
Tel: 61 3 9326 5885 Fax: 61 3 9326 8996